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**Electrorotational instabilities of a drop in a uniform DC electric field**[1] PETIA VLAHOVSKA, JEREMY KOCH, MICHAEL MIKSIS, Northwestern University — In a uniform electric field, a weakly conducting drop bearing zero net charge initially adopts a prolate or oblate spheroidal shape, with both the shape and flow axisymmetrically aligned with the applied field - a classical result from G.I. Taylor. At higher field strengths we find two symmetry-breaking instabilities: a high viscosity drop undergoes Quincke rotation (the global flow acquires a rotational component), while low viscosity drops only develop a secondary flow – a series of surface vortices – in a belt along the drop equator. We explore these phenomena experimentally in a silicone oil/castor oil system to map the region of the vortices-belt instability as a function of fluid viscosity and electric field strength.

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